

433-174 AU 3303 49407

WO 094014383 A1  
JUL 1994INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

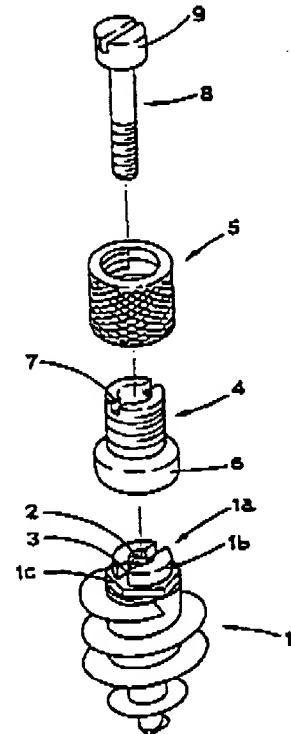
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification: A61C 13/00, 8/00	A1	(11) International Publication Number: WO 94/14388
(21) International Application Number: PCT/IT93/00132		(43) International Publication Date: 7 July 1994 (07.07.94)
(22) International Filing Date: 17 December 1993 (17.12.93)		(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, US, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(30) Priority Date: B092A000452 22 December 1992 (22.12.92)	IT	Published With international search report.
(71)(72) Applicant and Inventor: BRUSCHELLI Paolo (IT/IT): Via Taven. 59, I-63019 S. Elpidio a Mare (IT).		
(74) Agent: DALL'OLIO GIANCARLO INVENTION S.N.C.: Via del Castello, 13, I-40124 Bologna (IT).		

(54) Title: METHOD FOR MAKING IMPLANT PROSTHESES AND DEVICE FOR CARRYING OUT SUCH METHOD

## (57) Abstract

The method provides to apply a plurality of endo-osseous screws (1) to the patient's osteo-  
gingival area, the endo-osseous screws being provided with respective tubular spacer cylinders  
(4) mounted by fixing screws (8) and carrying respective ring nuts (5) screwed thereon. Then, a  
(4) mounted by fixing screws (8) and carrying respective ring nuts (5) screwed thereon. Then, a  
provisional connection bar (11) is made, of calcifiable material, in which there are incorporated  
by the ring nuts (5); the connection bar (11) is then removed from the endo-osseous screws (1), by  
unscrewing the fixing screws (8), and the spacer cylinders (4) are taken out from the ring nuts  
(5). Beginning from a cast formed about the connection bar (11) of calcifiable material, a final  
connection bar (12) is made by melting the bar (12) incorporating the ring nuts (5) in the original  
position and orientation. The connection bar (12) is mounted on the endo-osseous screws (1) in  
which the spacer cylinders (4) have been previously inserted, screwing the spacer cylinders (4) in  
the ring nuts (5) of the bar (12), and finally, the connection bar (12) is mounted by screwing the  
fixing screws (8) which pass through the spacer cylinders (4) and engage the endo-osseous screws  
(1).



BEST AVAILABLE COPY

WO 94/14388

PCT/IT93/00132

METHOD FOR MAKING IMPLANT PROSTHESES AND DEVICE FOR  
CARRYING OUT SUCH METHOD

TECHNICAL FIELD

5 The present invention lies in the technical field concerned with the manufacture of implant prostheses. More particularly, the invention relates to a method for making implant prostheses and to a  
10 device for carrying out such method.

BACKGROUND ART

It is known that in the odontology field, for  
15 the application of the dental prostheses, there are commonly used a plurality of endo-osseous screws inserted surgically in the osteo-gingival area. Such screws preferably have respective stumps that support the related prosthesis.

20 Generally, the prosthesis is constituted by a bar that joins the above mentioned stumps to each other, and that has attached thereto an exostructure, or outer structure, carrying the actual dental elements.

25 Besides fixing the exostructure, the connecting bar determines the distribution of the forces acting on the prosthesis, e.g. during the mastication process.

Once it was used to fasten such connecting bar  
30 to the exostructure by means of a cement, while more recently the connecting bar is fastened by means of very small fixing screws.

WO 94/14388

PCT/IT93/00132

- 3 -

presently provokes the waste of the whole work, since it is not possible to make corrections even if only one implant element of the prosthesis is damaged.

5

#### DISCLOSURE OF THE INVENTION

The object of the present invention is to propose a method that allows to produce an implant prosthesis, in a simple and rapid way, that does not cause any inconvenience or discomfort to the patient and does not require complex adaptations and adjustments.

The said object is obtained in accordance with what has been reported in the claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The characteristics of the invention are pointed out in the following, with a particular reference to the enclosed drawings, in which:

- Fig. 1 shows an exploded perspective view of the implant unit for fixing the prosthesis to the osteo-gingival area;
- Fig. 2 shows a longitudinal section view of such implant unit in a mounted configuration;
- Figs. 3 to 12 show subsequent phases through which the subject method is carried out.

#### BEST MODE OF CARRYING OUT THE INVENTION

With reference to the above mentioned figures,

PCT/IT93/00132

WO 94/14388

- 5 -

to the endo-osseous screw 1 by means of a fixing screw 8, that is screwed into the threaded hole 2. It is to be noted that the head 9 of the fixing screw 8, designed to go into abutment against the spacer cylinder 1, is so sized that it passes freely inside the ring nut 5.

Also the spacer cylinder 4, the ring nut 5 and the fixing screw 8 are preferably made of pure titanium.

10 The subject method is now illustrated with reference to the figures 3 to 12, in which, for sake of clarity, reference is made to a part of the implant prosthesis comprised between a couple of endo-osseous screws, of the type previously  
15 described.

As it is seen in fig. 3, the endo-osseous screws 1 are surgically applied to the patient's osteo-gingival area, without caring too much about maintaining them parallel to each other.

20 The respective spacer cylinders 4 are then mounted on the endo-osseous screws 1 and fixed by the related fixing screws 8. (see Fig. 4). Then the ring nuts 5 are screwed into the spacer cylinder 4 (see Fig. 5). At that moment, a provisional  
25 connecting bar 11, of calcinable material, is made and the ring nuts 5 remain incorporated therein (see Fig. 6).

The fixing screws 8 are removed so to allow to detach the connecting bar 11 from the endo-osseous  
30 screws 1. The removal of the fixing screws 8 allows, in fact, to remove the spacer cylinders 4, screwed into the ring nuts 5, from the head of the

WO 94/14388

PCT/IT93/00132

- 7 -

movement of the spacer cylinders 4 in the ring nuts 5 of the bar 12.

Therefore, the connecting bar 12 is fixed in the patient's mouth in the firm and correct way, independently from the parallelism of the endo-osseous screws 1. (see Fig. 11). Finally, an exostructure 14 carrying the actual dental elements is joined to the connecting bar 12 (see Fig. 12).

#### 10 INDUSTRIAL APPLICABILITY

The described method allows to obtain, in a simple and rapid way, the implant prosthesis, without provoking any inconvenience to the patient who does not have to undergo prolonged and repeated trial sessions and tests.

In fact, the parallelism of the endo-osseous screw is not required for the preparation of the prosthesis, since the ring nuts 5 incorporated in the connecting bar 12 maintain the original position, allowing for a perfect and immediate lining up with the spacer cylinders 4 mounted on the screws 1.

The screwing of the spacer cylinders 4 in the ring nuts 5 of the connecting bar allows also, as has been already noted, make up for possible imperfections resulting from the twisting of the connecting bar 12 during the melting phase.

It is also to be pointed out that, even if any pathology occurred in the post-operation period or, anyway, one of the implant elements appeared defective, it is not necessary to remove the whole

WO 94/14388

PCT/IT93/00132

- 3 -

## CLAIMS

1. Method for making implantation prostheses, characterized in that it provides:

5       applying a plurality of endo-osseous screws, in the patient's osteo-gingival area, said screws being provided with respective tubular spacer cylinders (4), axially mounted by means of respective coaxial fixing screws (8) carrying respective screwed ring  
10       nuts (5);

          making a provisional connecting bar (11), of calcinable material, in which said ring nuts (5) are incorporated;

15       detaching said connecting bar (11) from the said endo-osseous screws (1) by unscrewing said fixing screws (8);

          removing said spacer cylinders (4) from said ring nuts (5) incorporated in the said connecting bar (11);

20       making a final connecting bar (12) by melting into a cast obtained from said provisional bar (11) of calcinable material, said final bar (12) incorporating said ring nuts (5) in the original position and orientation;

25       mounting said connecting bar (12) on said endo-osseous screws (1), onto which said spacer cylinders (4) have been precedently set, said mounting being performed by screwing the spacer cylinders (4) into said ring nuts (5) of the bar  
30       (12);

          fixing said connecting bar (12) by screwing said fixing screws (8), said screws (8) passing

WO 94/14388

PCT/IT93/00132

- 11 -

externally and featuring, at the bottom, a widened part (6) forming a kind of bell and designed to be joined axially to said head of the endo-osseous screw (1);

5 a ring nut (5), dipped firmly in a relative provisional connecting bar (11), or final bar (12), and designed to be screwed on said spacer cylinder (4);

10 a fixing screw (8) for tightening said spacer cylinder (4) that is designed to be screwed into said threaded hole (2) of said endo-osseous screw (1), the head (9) of said fixing screw (8) being designed to strike against said spacer cylinder (4) and to pass freely through said ring nut (5).

15

6. Device according to claim 5, characterized in that the head (1a) of of said screw (1) has a transversal notch (3), and is in form of a cylindrical section delimited at the bottom by a peripherally enlarged section (1c) having regular  
20 polygonal cross-section, in order to be engaged by a special socket spanner to which the above mentioned tool is connected.

25

30

WO 94/14388

PCT/IT93/00132

1 / 4

FIG. 1

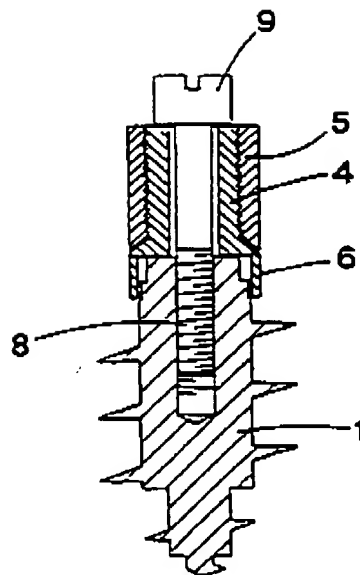
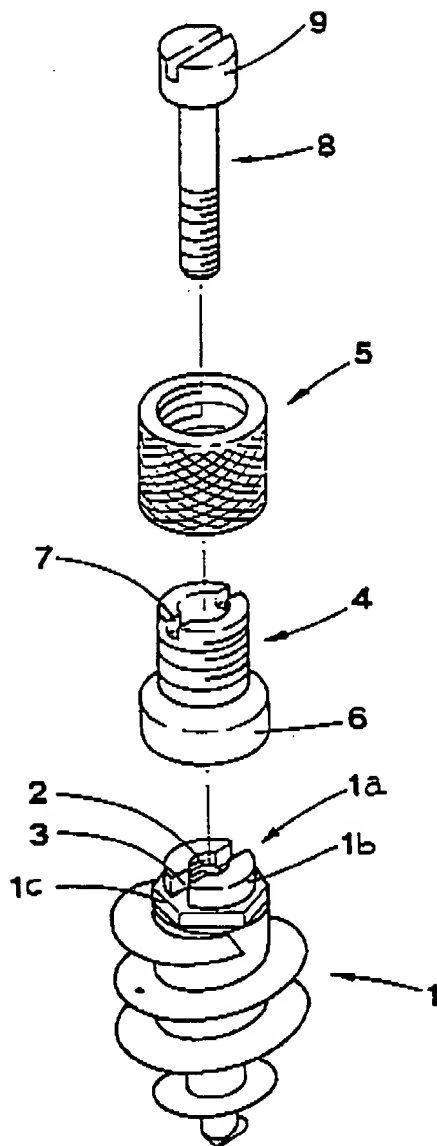


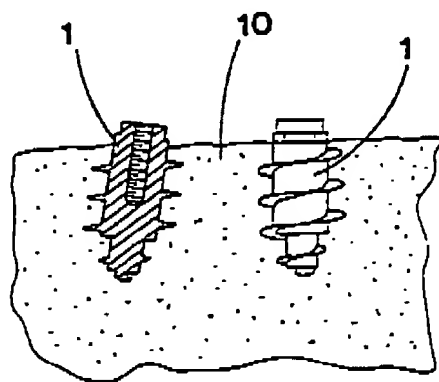
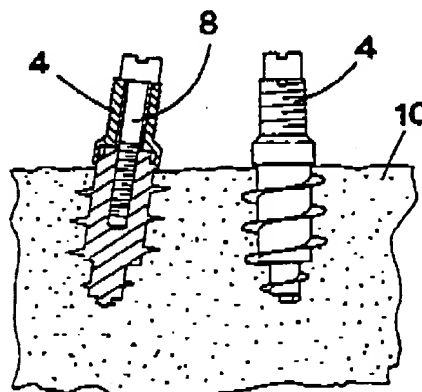
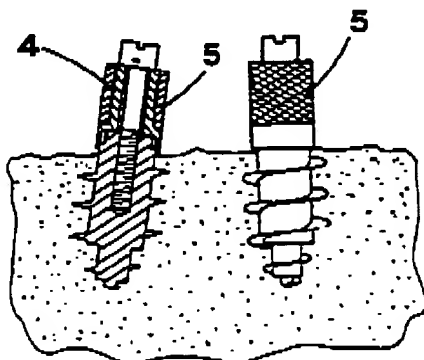
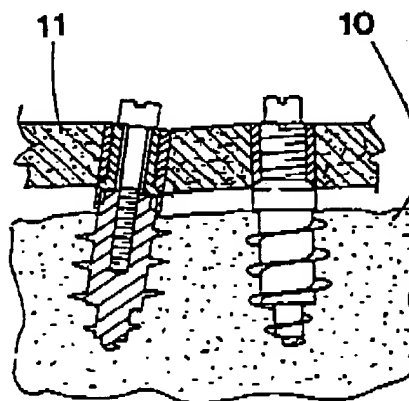
FIG. 2



WO 94/14388

2 / 4

PCT/IT93/00132

FIG. 3FIG. 4FIG. 5FIG. 6

WO 94/14388

3 / 4

PCY/IT93/00132

FIG. 7

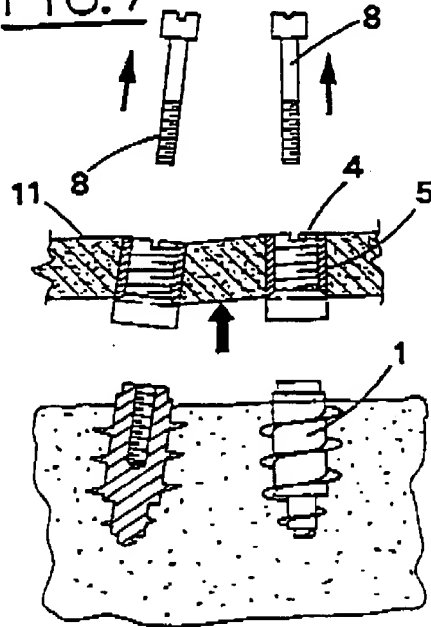


FIG. 8

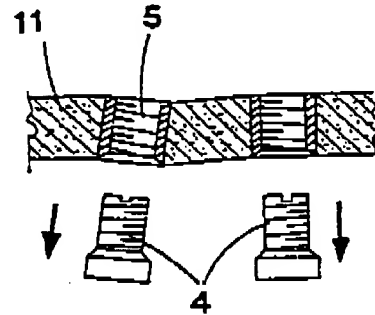


FIG. 9

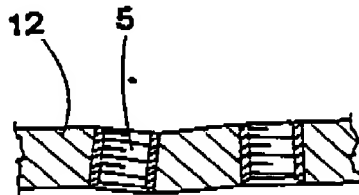
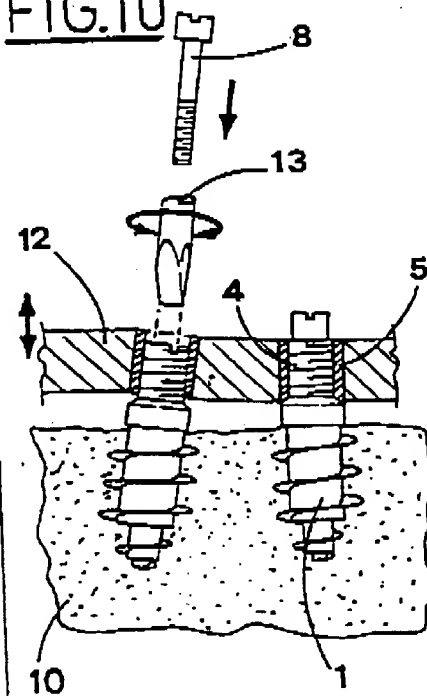


FIG. 10



WO 94/14388

4 / 4

PCT/IT93/00132

FIG. 11

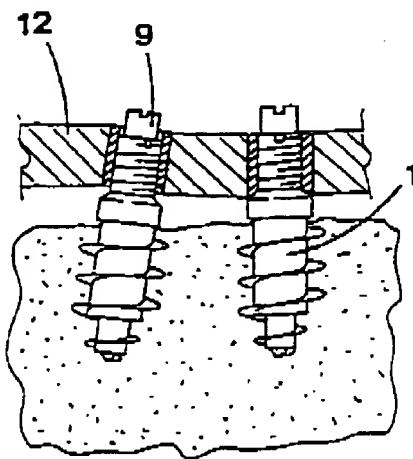
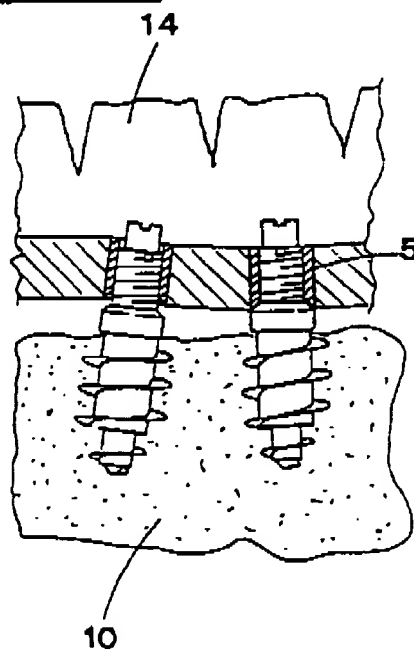


FIG 12



**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** \_\_\_\_\_

### **IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**